

Effects of Fire Frequency and Season on Longleaf Pine Groundcover Vegetation: Results of Three Studies

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Fire frequency and fire season are two components of the fire regime that can be relatively easily manipulated by fire managers. Variation in these two factors may have important influences on forest structure and species composition.

We report here results of three studies designed, in part, to examine effects of fire regimes on vegetation in longleaf pine forests. We will focus on fire effects on groundcover vegetation, the most species-rich component of these forests. The three studies include: 1) The Tiger Corner Study, Francis Marion National Forest, SC, ongoing since 1959; examines effects of fire frequency (i.e., annual, biennial, triennial, and quadrennial burns). Burning is usually conducted in late winter. 2) The St. Marks Study, ongoing since 1980 at the St. Marks National Wildlife Refuge, FL; examines effects of habitat, and fire season (8 different seasonal burn treatments). 3) Longleaf Pine Fire Study (LPFS), Francis Marion National Forest, begun in 1992; examines effects of habitat, fire season (dormant vs. growing), fire frequency (biennial vs. quadrennial), and regularity of fire (regular vs. random) on vegetation.

The 35-yr Tiger Corner Study demonstrates striking effects of fire frequency. Annual and biennial-burn plots are dominated by a diversity of grasses and forbs, while less frequently burned plots are less diverse with a greater abundance of woody plants. In contrast to these effects of fire frequency, effects of season of burn on groundcover vegetation are less pronounced. Few significant changes have occurred in the groundcover vegetation at the St. Marks plots, even after 14 yrs of seasonal burning. Consistent with the long-term study at the Santee Experimental Forest (Francis Marion National Forest), early results from the LPFS suggest that growing season fires may be more effective than dormant season fires in reducing woody stem density. Certain grasses (e.g., *Aristida virgata*) and bracken (*Pteridium aquilinum*) also declined significantly after growing season burning.

We conclude that longleaf pine forests require annual or biennial burning in order to maintain a high diversity of species in the groundcover. Burning season appears to be of secondary importance, except, perhaps in annually burned plots (e.g., see results of the Santee Study). However, significant effects may occur in some years depending in part on interactions with climate and fire behavior.